

## ***What is this list?***

This document lists methyl bromide alternatives, by crop, that were identified by international technical advisory groups under the Montreal Protocol. The list includes chemical treatments and/or procedures that are:

- (1) registered in the United States, and
- (2) “technically feasible for controlling pests” (Methyl Bromide Technical Options Committee (MBTOC), 1998).

Thus, an “X” for a specific alternative for a given crop indicates that the specific chemical has “technical potential” to replace methyl bromide.

This list of alternatives is derived from a corresponding list that addresses all alternatives, by crop, that were identified by past reports produced by the United Nations’ technical committees and panels: the Methyl Bromide Technical Options Committee (MBTOC) reports ([http://www.teap.org/html/methyl\\_bromide\\_reports.html](http://www.teap.org/html/methyl_bromide_reports.html)) and Technology and Economic Assessment Panel (TEAP) reports ([http://www.teap.org/html/teap\\_reports.html](http://www.teap.org/html/teap_reports.html)).

## ***How do I use this list?***

**The list represents a baseline for all methyl bromide users in the U.S. The list does not address local regulatory issues or location-specific technical issues affecting the use of the alternatives. Furthermore, the list does not address the economic feasibility of the alternatives.** EPA does not necessarily believe that alternatives in the list are feasible for all U.S. methyl bromide users.

## ***How should I respond to this list?***

EPA plans to request applications for critical use exemptions in mid-2002. A notice will be published in the Federal Register that will further delineate how to apply for a critical use exemption, including how to respond to the alternatives in this list and how to submit an application. We will post that Federal Register notice on this website, so please continue to check this website for the request for applications.

If you are considering applying for a critical use exemption from the phaseout of methyl bromide (<http://www.epa.gov/spdpublic/mbr/cueqa.html>), you will be expected to address any technical, regulatory, or economic issues limiting the adoption of the alternatives for your crop in this list. Furthermore, you will be expected to address any technical, regulatory, or economic issues limiting the adoption of non-chemical alternatives for your crop in the international list at <http://www.teap.org>. Thus, you must make the case that the listed alternatives are either not technically feasible or not economically feasible for the particular circumstance for which an exemption is being requested.

If your crop does not appear in this list, please call the Stratospheric Ozone Information Hotline at 1-800-296-1996.

<b>Alternatives to Post Harvest Uses of Methyl Bromide</b>	<b>Durables (general</b>	<b>Artifacts</b>	<b>Beverages (coffee, cocoa, tea)</b>	<b>Cereal (grain) products</b>	<b>Cotton</b>	<b>Dried fish and meats</b>	<b>Dried fruit and nuts</b>	<b>Grains (general)</b>	<b>- Barley</b>	<b>- Rice</b>	<b>- Wheat</b>	<b>Herbs and spices</b>	<b>Pulses (grain legumes)</b>	<b>Seeds for planting</b>	<b>Timber and timber products</b>	<b>Tobacco</b>
<b>IN KIND ALTERNATIVES</b>																
Chloropicrin															X	
Carbon dioxide (high pressure)			X	X			X			X	X	X				
Ethylene oxide												X				
Phosphine alone and in combination		X			X			X								X
Propylene oxide			X									X				
Sulfuryl fluoride															X	
Sulphur dioxide																
<b>NOT IN KIND ALTERNATIVES</b>																
Aerosol formulations of pesticides														X		
Contact insecticides alone or with pest-free certification	X	X	X	X		X	X	X		X	X		X		X	X
Dichlorvos		X		X				X								
High pressure water alone or with insecticide																
Inert dust/diatomaceous earth	X		X	X				X		X			X			
pyrethroids, Insect growth regulators, botanicals)	X			X			X	X		X	X		X	X		X
Pheromones				X				X								
Physical removal + pesticide														X		
Preservatives (timber)															X	
Rodenticide																

<b>Alternatives to Post Harvest Uses of Methyl Bromide</b>	<b>Perishables</b>	Cut flowers and ornamentals	Fresh fruits	Vegetables	Root crops	<b>Structures</b>	Domestic premises	Flour mills	<b>Transport</b>	Aircraft	Freight containers	Other vehicles	<b>Comments</b>
<b>IN KIND ALTERNATIVES</b>													
Chloropicrin													
Carbon dioxide (high pressure)									X				
Ethylene oxide													
Phosphine alone and in combination											X	X	
Propylene oxide													Cocoa only
Sulfuryl fluoride													
Sulphur dioxide			X										Grapes only
<b>NOT IN KIND ALTERNATIVES</b>													
Aerosol formulations of pesticides	X	X	X	X									
Contact insecticides alone or with pest-free certification						X							Individual pesticides may be available for these uses
Dichlorvos	X	X							X				
High pressure water alone or with insecticide		X	X										
Inert dust/diatomaceous earth						X							
Pesticides of low volatility (organophosphates, pyrethroids, Insect growth regulators, botanicals)		X				X							Some pyrethroids may be available for limited use.
Pheromones						X		X					Limited availability
Physical removal + pesticide	X												Limited availability
Preservatives (timber)													
Rodenticide						X			X				

<b>Alternatives to Pre-Plant Uses of Methyl Bromide</b>	<b>Nursery/seedbeds - General</b>	<b>Strawberry nurseries (runners)</b>	<b>Forest tree nursery</b>	<b>Tobacco seedlings</b>	<b>Strawberries - fruit</b>	<b>Curcubits- General</b>	<b>Cucumber</b>	<b>Melon</b>	<b>Squash</b>	<b>Watermelon</b>	<b>Solanaceous Crops - General</b>	<b>Tomato</b>	<b>Pepper</b>	<b>Eggplant</b>
<b>IN KIND ALTERNATIVES</b>														
1,3-Dichloropropene (1,3-D, Telone ®)					X	X					X	X	X	
1,3-D, Brush burning	X			X										
1,3-D, Chloropicrin	X	X		X	X						X	X	X	
1,3-D, Chloropicrin, Metam sodium	X	X			X									
1,3-D, Chloropicrin, Pebulate ®												X		
1,3-D, Metam sodium	X	X												
Basamid ®	X		X	X										
Chloropicrin	X			X	X	X					X	X	X	
Sodium tetrathiocarbonate (Enzone ®)														
Metam sodium	X		X	X	X	X					X	X	X	
Metam sodium, Chloropicrin					X									
Metam sodium, Crop rotation							X	X	X		X	X	X	
Metam sodium, Solarization														
Nematicides					X	X					X			
<b>NOT IN KIND ALTERNATIVES</b>														
Solarization, fungicides											X	X	X	

Alternatives to Pre-Plant Uses of Methyl Bromide	Root Crops	Carrot	Potato	Sweet Potato	Other vegetable crops	Cabbage	Cauliflower	Lettuce	Onion	Pea	Ornamentals - general	Rose	Carnation	Chrysanthemum	Fruit, Nut Trees - Replant	Banana	Citrus	Nuts	Vineyard	Stone & Pome Fruit	Sod/Turf	Comments
IN KIND ALTERNATIVES																						
1,3-Dichloropropene (1,3-D, Telone ®)											X	X			X	X	X			X		
1,3-D, Brush burning																						
1,3-D, Chloropicrin											X				X	X						
1,3-D, Chloropicrin, Metam sodium																						
1,3-D, Chloropicrin, Pebulate ®																						
1,3-D, Metam sodium											X	X			X							
Basamid ®																					X	
Chloropicrin											X											
Sodium tetrathiocarbonate (Enzone ®)																			X			Geographic limitations
Metam sodium											X	X			X	X			X			
Metam sodium, Chloropicrin											X											
Metam sodium, Crop rotation										X	X											
Metam sodium, Solarization	X								X													
Nematicides					X										X	X	X					
NOT IN KIND ALTERNATIVES																						
Solarization, fungicides	X								X													